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DRAFT STATEMENT OF HYPOTHESES CONCERNING SOVIET R&D PROCESS (U)

INTRODUCTION (U)

(U) I am circulating this draft for discussion. Following the January meeting, Jim March and I have had a couple of sessions to discuss a hypothesis about Soviet decisionmaking we think ought to be given serious attention. This draft incorporates some thoughts concerning this hypothesis.

(U) In any case, I hope we can discuss this hypothesis at future meetings. Above all, I hope that readers will have suggestions as to corrections, improvements, ways in which it can be stated better, relevant examples, etc. We do not put this hypothesis forward as the exclusive picture of Soviet decisionmaking, but merely as another alternative that ought to be given serious consideration when one is faced with the problem of explaining past Soviet behavior and predicting future decisions.

- A.W.M.

I. PROBLEMS AND HYPOTHESES CONCERNING SOVIET BEHAVIOR (U)

(U) At our last meeting in late January, Ivan presented three or four anomalies in the current Soviet military posture or its R&D programs. These anomalies will be described in more detail below, but for the moment it is sufficient to indicate their general nature.

(U) Currently observed aspects of Soviet military programs are designated as anomalies or puzzles because they are hard to fit into, or make congruent with, a consistent series of strategic decisions. For example, the appearance of the FOBS system can be construed as an anomaly and raises a question as to whether the Soviets have changed their strategy. It has characteristics which seem to be useful only in a first-strike role, whereas most, if not all, of the rest of the Soviet missile posture has a set of performance characteristics which make it useful only in a second-strike capacity. Thus the question "Is the emergence of FOBS the first sign of a change in Soviet strategy from a second-strike only design criteria to a strategy that aims also at obtaining first-strike capability.

(C) The development of FOBS might be evidence of such a change if it were true that Soviet development programs were exclusively the result of a process in which decisions on the technical characteristic of future systems were derived from, and entirely consistent with, a set of top level strategic statements. This general hypothesis about the decision process could be called the rational policy model. It is by far the dominant model that people use in speculating about Soviet decisions. The use of the rational policy model is especially employed where there is very little direct evidence as to decision processes. Moreover, it is more prevalent as a mode of thinking about the Soviets among people who themselves are involved in optimizing the U.S. military posture, or trying to rationalize U.S. planning processes. It is a model that is applied less by members of the intelligence community but even they tend to use it when direct information is lacking.

(U) When using the rational policy model anomalies (behavior that doesn't fit very well, especially with rather firmly held simplified reconstructions of Soviet strategy) are often put down as Soviet

~~strategy) are often put down as Soviet~~ mistakes or miscalculations of one sort or another. Or perhaps as a perturbation from the standard pattern of behavior, caused by the activities of some high level political personality.

(U) Clearly, other hypotheses about the process by which new military equipment is designed and enters the Soviet force posture are possible. Indeed, they are likely to be nearer the truth than the rational process model. The more closely one looks at the evolution of Soviet military posture the clearer it is that attempts to explain the awkward examples by relegating them to the category of mistakes of Soviet miscalculations are not convincing or very useful. The "mistakes" are too numerous, and putting them to one side as exceptions to the more normal Soviet rational planning assumed by the rational process model passes up the opportunity to search for more relevant models that can include less than perfect behavior.

(U) The alternative model of the process by which new weapons systems enter Soviet posture suggested here is as follows: Weapons design with regard to technical characteristics takes place, several levels down, within the Soviet political and military hierarchy. It is centered in design bureaus, perhaps associated with a particular branch of the Armed forces. The design and development process generates weapons and their designers and proponents look for opportunities to sell the weapons to people in the various branches of the Soviet military forces and at higher levels. The people in charge of portions of the Soviet forces look for ways to use new weapons they acquire and this leads, over time, to marginal shifts in the operative military strategy of the Soviet Union.

(U) In this hypothesis, there would be room for an attempt on the part of the designers to design for perceived markets, that is the desires of the military leaders of the branches of Soviet military forces, and other offices in the higher levels of the Soviet military establishment. But it emphasizes the role of perceived opportunities for technological improvement lower down in the system. This perception leads to particular changes in the technical characteristics of a new

generation of Soviet weapons systems. Some of these new weapons are procured and change the capabilities of Soviet forces, which in turn changes the operative strategy and military plans of the Soviet military establishment.

(U) The more ambiguity regarding the future state of the world, and in particular the future military technology of the Soviet major opponent, the more likely this type of behavior would be. On the other hand, the process of changing Soviet posture may not work exclusively in this manner. Clearly, the top level people decide on some of the major outlines of the force through their control of budgets. From time to time there will be broad top level determination of the general shape of the forces. These strategic policy decisions reorient the general direction of the evolution of Soviet posture. The hypothesis we are considering relates more to what happens within some broad framework set from above. But even here one of the problems in making this hypothesis credible to people used to thinking in terms of the rational process model will be to explain how the Soviet system could work in such a way that the lower level institutions and organizations really dominate at least from time to time the outcome of the force posture process.

(U) Let me turn to two or three of the anomalies or puzzles put to us at the last meeting:

(C) 1. The Development of a Soviet solid-fueled ICBM. In this case the puzzle is that we see at a rather late date the development of a solid-fueled ICBM. This development [~~which~~] will cost a good deal of money, especially since the guidance system the Soviets have developed for all of their other missiles is technically inconsistent with a solid-fuel missile. So the new development will involve not only the missile itself but a whole new guidance technology and philosophy. Since the Soviets could have (given their currently available technology) produced good small ICBM's with storable liquid fuel, why have they engaged upon this new system or set of systems? In a word, they are developing very expensive new systems that will not be any

improvement on systems available to them within the liquid fuel technology. At this point in time, it doesn't seem cost-effective to us for them to be developing the new system.

(C) There could, of course, be a number of explanations for this behavior, including that our estimates of the cost to the Soviets of the solid program is too high. Or there may be more effectiveness. But the Soviet behavior could be consistent with something like the hypothesis stated above. There is some reason to believe that in the missile area, as well as in a number of other areas, the Soviets have tended to set up design bureaus headed by a major scientist or design team, whose job it is to produce new weapons designs. There is a question of why the solid-fuel missile design bureau is so late in producing weaponry that can be tested and observed. But once established it carries out its design function and pushes for the acceptance of its products. Thus the appearance of the solid missile systems may at this point be the natural consequence of the establishment many years ago of a third missile design bureau, and not the result of any recent or current cost-effectiveness studies at top levels. Why some sort of cost-effectiveness calculations does not intervene to shut off the program or to at least limit the deployment is an interesting question. But perhaps we can address that question later.

(C) 2. THE FOBS System: Here the anomaly, as suggested above, is that a system has been developed and tested. Probably it will enter the force. Its technical characteristics are such that it is an inferior second-strike weapon, since it is less accurate than current missiles and delivers a reduced payload. But it might be used as part of a first strike, low-warning attack on U.S. bomber forces. Most of the rest of the force does not seem to have characteristics that suggest a design for first-strike capability -- indeed the so-called BETA paradox make it appear that the technical capabilities of most Soviet missiles is developing in ways that make them less and less capable of accurate, effective attacks against the U.S. hardened missile force. Thus FOBS does not seem consistent with the over-all design philosophy of the rest of the force.

(C) Again, once one drops the assumption that weapons developments are guided by some over-all strategic concepts, the appearance of FOBS ceases to be an anomaly. The explanation of the BETA paradox itself most likely lies in the Soviet internal security arrangements with regard to atomic weaponry, and the institutionalization of the weapons design program and the missile design program in separate design units with essentially no communication between them. The newest generation of Soviet atomic weapons may well have been designed to optimize yield-to-weight ratios irrespective of the effect the geometry of such designs would have on the re-entry vehicle characteristics. This could lead to a tendency for the ballistic coefficient to decrease and degrade accuracy.

(U) Thus, what we take to be a seonnd strike design goal may in fact be the result of a lack of appropriate coordination between atomic weapon design teams and missile design teams. On the other hand, it may be a development pursued at one of the design bureaus that found sufficient favor in the Soviet military establishment to be pursued through its research and development phase. Its development is more consistent with a hypothesis that assumes that weaponry design is rather decentralized, takes place several layers down in the organization. Its deviant characteristics may more reflect the variety allowed in Soviet programs than a change from a second strike design goal -- that may not exist in any case.

(U) 3. The TALLIN System: This is an air defense missile system which now appears to be designed to attack high flying aircraft. The anomaly resides in the fact that U.S. bomber aircraft are not planning to penetrate at high altitudes. This has been a well advertised matter. Thus the puzzle, why are the Soviets deploying this system? Again the assumption of highly rational planning is suspect. Of course in the case of the TALLIN system the lead times involved could explain at least the development of the TALLIN system. The development decision would have been made at a time when the United States could be seen developing the B-70. One could argue that it was rational to develop a defense against it, once developed deployment could perhaps not be stopped within the Soviet military organization.

(U) But one must raise the question whether the Soviet decision some years ago to develop and deploy the TALLIN system against the projected B-70 program was part of some over-all rational plan, or the response of the relevant design bureaus and the Soviet air defense command to a perceived technological opportunity and a threatening U.S. development. If so, what weight is given to following up technological possibilities as contrasted to designing weapons to meet projected U.S. threats? How are requirements formulated and made known to the design bureaus? To what extent do the design bureaus explore broadly on the technological frontier perhaps in part following U.S. technological developments independently of requirements stated by the military users?

II. WHY MIGHT THE ALTERNATIVE HYPOTHESIS BE TRUE?

(U) 1. The technical information relating to weapons possibilities is probably controlled by people several levels down in the Soviet military organization, who are themselves interested in pushing the development program. The people in the design bureaus, at an early stage of the design process, have exclusive knowledge of the technological possibilities. After they have decided for one reason or another that the design is one they are interested in going forward with, they will be a major source of information useful in judging other alternatives that might have been chosen. But by that time they will undoubtedly be committed to their own choice. Immediately above them, people in the military forces may have a better technical view of the possibilities than those at the highest levels, and depending upon the relationship of the design bureau to the using organization, may have already been consulted and have an interest in the new weapon.

(U) 2. The design bureau's perception of the technological possibilities itself may be biased. The design bureau staff will have specific capabilities and hence be searching for new developments in some areas more assiduously than others. Hence, their historically determined capabilities and interests will limit the alternative generated for consideration at the level of the directors of the design bureau, but also at all levels above them.

(U) 3. The design bureaus exist as going organizations probably related to specific parts of the military organization. The national military strategy planning done at higher levels in the military establishment will probably evolve in directions justifying the continued existence of the design bureaus. The people doing the upper level planning will in part be called upon to justify the past existence and the continuing existence of the design bureaus. Thus military strategy and current military plans are likely to change so as to justify

the usefulness of the output of the design bureau's. This, along with the fact that the design bureaus may be the major source of new weapons alternatives, leads to the type of process suggested by the hypothesis.

(U) 4. Although this type of process is irrational in classical decision theory, it is not necessarily bad or seriously defective in producing a steady improvement in Soviet posture. It may produce, depending upon the over-all environment, very good results. In particular, it may generate a good deal of innovation, much more so than a system which consistently planned from the top down.

(U) 5. The existence of several competitive design bureaus within a given area may produce healthy competition. However, the isolation of some parts of the design process from other parts, due both to their separate organizational existence and the Soviet security system may well cause problems as was suggested above.

(C) We will need to produce arguments, evidence, reasons why the particular hypothesis stated in this note, or some modified form of it, might be preferable to the standard rational policy model in explaining Soviet behavior. Why this hypothesis might be true, why the Soviet military organization might operate this way, are matters that will require a good deal of thought and consultation among us. It seems to me that people within the intelligence community occasionally, perhaps very often, explain things in ways that are consistent with this hypotheses to the standard rational policy model are well worth entertaining.

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(C) It would be good if we could describe alternative ways in which the weapon development process may work, if only as a basis on which the intelligence community can address the information they have. In particular, I think one needs to know more about the process by which designs are rejected. Some words were said about this at our last meeting. For example, failure rate during the test process may be a determining factor in rejection of a design. If so, this could lead

to simpler missile designs by the design bureau. Since if technical failure during test is a criteria used to lop off programs, this would bias the design bureaus toward simpler designs.

III. IF THE ALTERNATIVE HYPOTHESIS IS TRUE, WHAT OF IT?

(U) First, it would suggest that the goals emerge from activities, at least in some part, and not exclusively the other way around. Goals then depend in part on the past activities, the past posture, with marginal adjustments as capabilities change.

(U) If this hypothesis were true, then it would perhaps enable us to make predictions of future goals and future posture if we knew more about the trends in technology within the Soviet Union and how the research and development process operates.

(U) If the United States wants to influence the future Soviet posture, it needs to influence, if it can, the direction of technological development. This might be possible by exhibiting and advertising U.S. technology. This hypothesis, if true, suggests that the usually recommended top level negotiations may have very little effect on Soviet force posture. Unless, of course, a successful negotiation were to lead to some major top level policy decision regarding the Soviet military program, perhaps putting a limit on the number of ICBMs, etc. But short of that the hypothesis would suggest that the sources of change in the posture are more determined by the steady institutional process related to the developments of new weaponry several layers down in the organization.

(U) It would be interesting and useful at some point to see whether this hypothesis works for the United States. What part of the behavior of the U.S. military establishment is consistent with this hypothesis as contrasted with one emphasizing top level setting of goals and subsequent determination of posture on the basis of these goals? It would also be good to know more about the amount of emulation that takes place between national military establishments. One has a sense that, as in clothing, there are style leaders. At the moment in many areas, the United States is the military style leader. Its choices dominate the choices of the French and the British military establishments, for example. They may, to some extent, influence Soviets. Especially since the Soviets may consider themselves in a position

where they are "catching up". To that extent, a broad development of new military technology in parallel to the United States may have been a basic policy. However, we also know that there have been other forces at work, which have led to the development of Soviet weapons systems not at all closely modeled on U.S. systems.

(U) On the other hand, the Chinese, for example, who may be too poor to engage in emulation, at least an emulation consistent with a goal of playing a major power role in the world. This might lead to idiosyncratic, nonemulative behavior. Hence, while emulation may be a major factor in the development of Soviet posture, it is less likely to be so in the case of the Chinese.

IV. QUESTIONS FOR DISCUSSION?

(U) 1. How can we state this hypothesis better? It may have to be developed in somewhat different ways to accommodate the process by which Soviet military weapons are developed from the process by which the Soviets decide on procurement and deployment.

(U) 2. There may be several variants of this general hypothesis. What are they?

(U) 3. What kinds of evidence would tend to support this hypothesis? How consistent is it with respect to other things that we know about the operation of other large organizations? What do we know about the Soviet system, both organizationally and culturally, that can assist us in deciding whether this hypothesis is a plausible one? The speculations of Crozier may be of some value here.

(U) 4. It is unlikely, as suggested above, that this hypothesis by itself invariably will describe the decisionmaking process within the Soviet military establishment. Sometimes, some kinds of decisions are made at the top, and the lower levels of the organization have to conform with them. What are these decisions likely to be? What do the top levels attend to? What triggers major adjustments directed from the top? How can we predict whether the top downward decision process for the up-from-the-bottom decision process will operate?

(U) 5. What organizational features of the Soviet military establishment influence, and in what way, their perception of U.S. programs? What is the effect of the multiplicity of the perceptions of U.S. force posture (current and future) associated with various parts and levels of the Soviet military establishment? What do we know of the structure of Soviet intelligence and the possibility of this structure in producing multiple views of U.S. force posture? Are these equivalent to the three service view in the United States? If so, how many are there?